



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

# PUBLIC HEALTH REPORTS

VOL. 37

MAY 26, 1922

No. 21

## THE SEROLOGICAL GROUPING OF MENINGOCOCCUS STRAINS ISOLATED IN NEW YORK CITY IN 1921 AND 1922.

By ALICE C. EVANS, Assistant Bacteriologist, United States Public Health Service.

A collection of meningococcus strains was made in 1921 for the original purpose of obtaining freshly isolated strains to replace for the manufacturers of the antiserum some of those which had been long under artificial cultivation, because previous observations had led to the belief that after long cultivation certain strains of meningococci lose some of their tropinogenic power. The original plan was to treat rabbits with the strains as they were received, and make a serological study only of those strains which proved good for the production of antibodies, discarding those which were not suitable for the purpose at hand. After a time it became evident that the percentage of strains in the various serological groups was so unlike the percentages found in the studies made in 1918-19 (see Hygienic Laboratory Bulletin No. 124) that it would be of interest to classify all strains and compare the grouping with that found in the earlier studies. Since such a classification was not originally contemplated, the data are incomplete for some of the strains.

A limited number of strains isolated in 1922 have also been studied in respect of their tropin and agglutinin relationships. The results for each year are summarized in Tables I and II, together with summaries of the results obtained in the studies made in 1918-19.

TABLE I.—*Tropin grouping of meningococci.*

Group.	1918-19 (63 strains).	1921 (27 strains).	1922 (14 strains).
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
R.....	61.9	33.3	35.7
S.....	25.4	33.3	0
T.....	4.7	0	0
U.....	1.6	0	0
Z.....	6.4	25.9	42.9
Not to be classified in the above groups.....	0	7.5	21.5

TABLE II.—*Agglutinin grouping of meningococci.*

Type.	1918-19 (128 strains).	1921 (16 strains).	1922 (15 strains).
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
I.....	37.5	18.7	6.7
II.....	25.8	18.7	0
III.....	21.1	12.6	0
IV.....	2.3	6.3	13.3
Not to be classified in the above types.....	13.3	43.7	80.0

The methods used in the study here reported are essentially the same as those described in the publication referred to above. Deviations from those methods will be described in a more detailed report to be published later. Briefly, a strain was assigned to a given tropin group when a suspension of a density equivalent to 5,000 parts per million (silica standard) absorbed tropins from the group serum as completely as the homologous antigen of the same density. The strains placed in Group Z were an exception to that rule, however, for they absorb partially from one, two, three, or all four of the other groups, but fail to absorb sufficient tropins from any one of the well-defined groups to be classified in them. The criterion of Butterfield and Neill, who studied the agglutinin relationships of the 1918-19 strains, was adopted for the classification according to agglutinin types. In order to qualify as a member of a type according to their criterion, the coccus in question was required to react as follows: After a suspension of the coccus has acted on the type serum, this type serum must be reduced at least one-half in agglutinin titer for its homologous type coccus, as compared with the unsaturated control type serum tested for agglutinin titer at the same time and under the same conditions.

The strains in the 1918-19 collection were isolated in widely separated parts of the United States, a majority of strains, however, coming from New York City. A few strains from England were included. There was no apparent correlation between serological types and geographical distribution. The strains in the 1921 and 1922 collections were all from New York City. We are indebted to Dr. Amoss, of the Rockefeller Institute, for one strain which was sent to the Hygienic Laboratory as a strain of unusual interest because it failed to agglutinate in polyvalent serum. The remainder of the strains were sent at our request, and were strains of no known especial interest, being those which happened to be at hand when requests for meningococci were made. We are indebted to Dr. Kerr, at the time in charge of the Public Health Service Hospital at Ellis Island, for two of the strains, and to the bureau of laboratories, New York City Department of Health, for the remaining strains. All strains were isolated from spinal fluid in cases of meningitis. The same strains were used for the type antigens and for the production of type serums as were used in the studies made in 1918-19. They remain true to type, with no apparent change in their serological properties.

The percentage of strains falling in the various tropin groups are given in Table I, which brings out the striking fact that whereas 93.6 per cent of the strains collected in 1918-19 could be classified in the well-defined Groups R, S, T, and U, only 66.6 per cent of the 1921 strains and 35.7 per cent of the 1922 strains could be so classified. It was a rare occurrence to find among the 1918-19 strains one which

did not belong to some one of the well-defined groups. On the other hand, the majority of strains thus far received in 1922 belong to the generalized Group Z, or show no relation whatever to the definite tropin groups. The 1921 strains are intermediary between the 1918-19 and the 1922 strains as regards their tropin affinities.

The serological transition in meningococci is even more striking when their agglutinin relationships are considered. Table II summarizes the agglutination reactions of the strains collected in the three periods. There is a marked decrease in the percentage of strains belonging to Types I, II, and III, a slight increase in the percentage of Type IV strains, and a remarkable increase in the percentage of strains which show no relationship to the four types. As in the case of tropins, the 1921 strains are intermediary between the 1918-19 and the 1922 strains in their agglutinative properties.

When tested against polyvalent horse serum such as is used in treatment of meningitis, a much larger percentage of strains were agglutinated than would be indicated by the results presented in Table II. Out of fifteen 1922 strains, ten were agglutinated satisfactorily by the polyvalent serum; three gave a slight reaction; and only two showed an absence of agglutinin receptors for the antibodies in the serum used for these tests. A possible explanation of this discrepancy may be the presence of "group" agglutinins in the polyvalent horse serum.

The tables show a transition of serological properties of meningococci as regards both tropins and agglutinins, passing from the well-defined types of 1918-1919 to another serological order. It has not yet been determined whether new well-defined types may appear in the strains being isolated at the present time. The investigation thus far has made the impression, however, that such will not be found to be the case, but that the new strains are indefinite and generalized in their serological relationships. Hence the increase in Type IV strains deserves comment. The fact that the indefinite tropin group Z was observed to be roughly correlated with agglutinin Type IV strains when the study of the 1918-19 strains was made, gives some foundation for considering Type IV apart from Types I, II, and III, which included 84 per cent of the 1918-19 strains, coinciding in a general way with tropin groups R and S (group R coincides roughly with Types I and III, and group S coincides roughly with Type II). The increase in percentage of Type IV strains along with the increase in percentage of strains of indefinite agglutinin type, coupled with the increase in percentage of tropin group Z strains and of strains showing no relationship with the definite tropin groups, gives further reason for considering Type IV of a somewhat different nature than Types I, II, and III.

The number of strains in the 1921 and 1922 collections is rather small to draw conclusions from. The serological differences between them and the 1918-19 strains are so striking, however, that we believe that they represent a general transition in meningococci which is of sufficient interest to justify this preliminary report. It is particularly desirable that strains from other sections of the country be studied, to determine whether the change observed in the New York City strains is country-wide.

### ADENOIDS.<sup>1</sup>

Nature intends that we should breathe through the nose and has so arranged that the air is strained, warmed, and moistened as it passes through the nose. This is very important. Unfortunately, about 10 per cent of all children have adenoids which interfere with

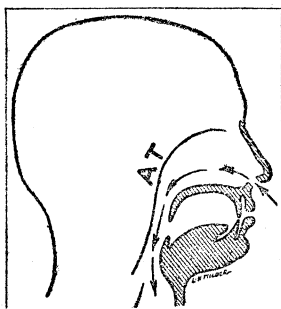


FIG. 1.

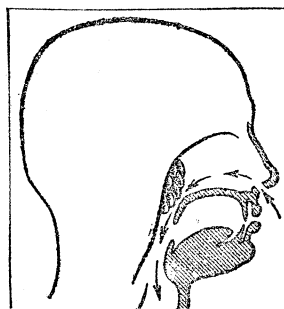


FIG. 2.

free breathing through the nose; and since so many serious results follow such a condition, parents should learn something about adenoids and their treatment.

#### WHAT ARE ADENOIDS?

Because adenoids are located up behind the palate and are, therefore, out of sight, a better understanding of them may be had by studying the accompanying diagrams.

The course of the air through the nose, along back of the palate, and through the windpipe, is indicated by arrows in Figures 1 and 2. At the place marked "AT" (Fig. 1), nature has provided a kind of moist tissue cushion which helps to filter impurities out of the air. This cushion is formed of what is called "lymphoid tissue" and is very similar to that which makes up the tonsils. In a large number

<sup>1</sup> Revision of a health leaflet on adenoids originally issued for popular distribution as "Keep Well Series" No. 2.